MDOT
Michigan Department of Transportation

OFFICE MEMORANDUM

DATE: May 23, 2005

TO: Region Engineers
Region Delivery Engineers
TSC Managers
Resident/Project Engineers
Region Construction Engineers

FROM: Larry E. Tibbits
Chief Operations Officer

John C. Friend
Engineer of Delivery

SUBJECT: Bureau of Highway Instructional Memorandum 2005-08
Implementation of the Vacuum Extraction Method for the Determination of Asphalt Binder Content

The purpose of this memorandum is to introduce the vacuum extraction process, a procedure for determining the asphalt binder content of Hot Mix Asphalt (HMA).

Some of the aggregate sources used for producing HMA in Michigan exhibit highly absorptive and variable properties. High absorption makes it difficult to determine the volumetric properties on which quality measurements and payment are determined. When calculating the asphalt binder content on projects with highly absorptive and variable aggregates, the vacuum extraction method provides more accurate results than the currently specified calculated method.

Specification Issues

In the following special provisions, the asphalt binder content is based on a calculated value using the sublot maximum specific gravity (Gmm) and the current JMF effective specific gravity (Gse):

- Special Provision for Furnishing and Placing Superpave Hot Mix Asphalt Mixture (with Sampling Behind the Paver) (FUSP 03SP504[A])
- Special Provision for Furnishing and Placing Marshal HMA Mixture (with Sampling Behind the Paver) (FUSP 03SP504[B]) (FHWA approval on August 20, 2002)

This is referred to as the back-calculated method.

During the 2005 construction season, the engineer (via a contract modification) may allow the contractor to use any of the extraction methods for determining the asphalt binder content described in ASTM D2172 instead of the specified back-calculated method. If the contract modification is approved, MDOT will use the vacuum extraction method described in ASTM

D2172 for verification. If the contract modification is not approved, contact the Construction and Technology Support Area's Construction Paving Unit for possible Gse adjustment procedures.

If a contract modification is approved allowing asphalt binder content to be determined using the chemical extraction, this method must be used for the remainder of the project.

Example of Contract Modification: Under Description of Changes, use the following wording.

The purpose of this contract modification is to change the method for determining the asphalt binder content as referenced in Frequently Used Special Provisions 03SP504(A) and 03SP504(B). The method for determining the asphalt binder content is to change from the back-calculated method to the vacuum extraction method described in ASTM D2172. The following revisions to the special provisions are:

Section d, Quality Assurance, 2. Hot Mix Asphalt Mixture (loose)., G. Composition of the Mixture, delete the following "Asphalt binder content based on calculated value using sublot maximum specific gravity (Gmm) and current JMF effective specific gravity (Gse);" and replace with "Asphalt binder content based on Test Methods for Quantitative Extraction of Bitumen from Bituminous Paving Mixtures (ASTM D 2172);"

Vacuum Extraction Solvent

The required extraction solvents to be used follow:

- BIOACT High Flash (Petroferm Inc.)
- Hisol Plus (High Flash Cleaner)

The extraction solvent selected from the approved extraction solvent list will be given to the contractor by MDOT at the pre-production meeting. The extraction solvent selected for the project will not change during the project.

Any questions regarding the extraction solvent or vacuum extraction equipment needs can be directed to Tim Crook, Bituminous Materials and Mixtures Specialist, at 517-322-5668.

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Chief Operations Officer Engineer of Delivery

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